

## MONOGRAPHIC STUDIES IN THE GENUS ELEOCHARIS

H. K. SVENSON

(continued from page 219)

## Series MACULOSAE

(Plate 191)

- a.* Sheaths firm at the apex; achenes black or purplish-brown.  
Sub-series: RIGIDAE....*b.*
- b.* Achenes 0.7–1 mm. long....*c.*
- c.* Achenes 1 mm. long; spikelets many-flowered, globose to ovoid; scales usually firm; culms 0.3–4 dm. high (widespread in warm or tropical regions).....42. *E. caribaea.*
- c.* Achenes 0.7 mm. long; tubercle depressed,  $\frac{1}{2}$  as broad as the achene; spikelets ovoid, 10–20-flowered; scales thin; plants dwarf, 4–10 cm. high (Texas).....46. *E. microformis.*
- b.* Achenes 0.5 mm. long....*d.*
- d.* Spikelets elongated, 2–8 mm. long, many-flowered; bristles translucent, much shorter than the achene; achene broadest at summit.....43. *E. atropurpurea.*
- d.* Spikelets not elongated; bristles opaque; achenes broadest below the summit....*e.*
- e.* Spikelets 2–3 mm. long, 5–15-flowered; culms 4–12 cm. long; bristles dull-brown to white, obscurely toothed; tubercle less than  $\frac{1}{3}$  as broad as the achene (Fla., W. Ind.)  
44. *E. praticola.*
- e.* Spikelets 1–2 mm. long, 3–9-flowered; culms 2–5 cm. long; bristles white, retrorsely toothed; tubercle  $\frac{2}{3}$  the width of the achene (Bahama Ids.).....45. *E. bahamensis.*
- a.* Sheaths membranous at the apex. Sub-series: OCREATAE....*f.*
- f.* Mature achene olivaceous....*g.*
- g.* Spikelets much thicker than the culms; bristles longer than to slightly shorter than achene....*h.*
- h.* Tubercle elongated; surface of achene smooth or punctulate; culms 2–15 cm. long (rarely longer) (E. U. S. and Can.)  
47. *E. olivacea.*
- h.* Tubercle not elongated....*i.*
- i.* Culms 12–26 cm. long; scales linear; surface of achene obscurely striate (Galapagos Ids.).....48. *E. galapagensis.*
- i.* Culms 3–5 cm. long; scales broadly ovate; surface of achene with elongate black striations (Mex.) 49. *E. Schaffneri.*
- g.* Spikelets of same diameter as the thickened culm; bristles glistening-white, shorter than achene (Brazil and Paraguay)  
50. *E. Sellowiana.*
- f.* Mature achenes black or deep-brown....*j.*
- j.* Spikelets 1–3-flowered; culms 1–4 cm. high (Trop. So. Am.)  
51. *E. capillacea.*
- j.* Spikelets many-flowered....*k.*
- k.* Scales appressed....*l.*
- l.* Scales yellow or greenish, not prominently keeled; achenes 0.8 mm. long; bristles shining-white, shorter than the achene (Trop. and subtrop. regions).....52. *E. flaccida.*
- l.* Scales purplish-brown, the lowest prominently keeled; achenes 1.3–1.5 mm. long, including the style-base; bristles reddish-brown, often longer than the achene (W. Ind. and So. Am.).....53. *E. maculosa.*

- k. Scales somewhat spreading, strongly keeled.....m.  
 m. Spikelet about 5-flowered (Afr.).....54. *E. intricata*.  
 m. Spikelet 10-15-flowered (Brazil).....55. *E. debilis*.

#### Sub-series RIGIDAE

42. *E. CARIBAEA* (Rottb.) Blake. FIG. 48. Cespitose: culms firm, 0.3-4 dm. high, striate and sulcate: sheaths prominent, stramineous, usually with a brown base and with firm, oblique, often attenuate apex: spikelets subglobose or ovoid, obtuse, many-flowered: scales ovate-orbicular, almost cartilaginous to membranous, yellow to pale-brown: style bifid: stamens 2 or 3: achene obovoid, 1 mm. long, lustrous-black; the spongy, whitened style-base variable in shape but usually much depressed: bristles 6-8, coarse, brown, exceeding the achene or occasionally lacking.—RHODORA, xx. 24 (1918); Merrill, Enum. Phil. Pl. i. 119 (1922). *Scirpus caribaeus* Rottb. Descr. Pl. Rar. Progr. 24 (1772) and Descr. Ic. Nov. Pl. 46, t. 15, fig. 3 (1773), ed. 2, 46, t. 15, fig. 3 (1786). *Scirpus capitatus* Willd. Sp. Pl. i. 294 (1798) in part; HBK. Nov. Gen. et Sp. i. 225 (1816). *E. capitata* R. Br. Prod. 225 (1810);<sup>1</sup> Torr. Ann. Lyc. N. Y. iii. 305 (1836); Boeckl. Linnaea, xxxvi. 461 (1869-70); Bentham & Mueller, Fl. Austr. vii. 296 (1878); Britton, Journ. N. Y. Micr. Soc. v. 102 (1889); C. B. Clarke in Hook. f. Fl. Br. Ind. vi. 627 (1893), in Durand & Schinz, Consp. Fl. Afr. v. 597 (1895) and in Urban, Symb. Ant. ii. 66 (1900); Britton and Brown, Ill. Fl. ed. 2. i. 313, fig. 764 (1913); Jepson, Fl. Cal. vi. 194 (1922); Barros, Anal. Mus. Nat. Hist. Buenos Aires, xxxiv. 400, fig. 6 (1928). *E. setacea* R. Br. Prod. 225 (1810).<sup>2</sup> *Eleogenus capitatus* Nees in Wight, Contr. Bot. Ind. 112 (1834). *Chlorocharis capitata* Rikli in Pringsh. Jahrb. xxvii. 564 (1895).—In ditches, marshes, and on banks of streams from "Maryland"<sup>3</sup> and South Carolina to Florida, westward to Texas and California, and southward through tropical America to Peru, Paraguay and southern Brazil. Also common in the tropics of the Old World. Specimens examined: SOUTH CAROLINA: Sullivan Island, Gibbes. FLORIDA: Crescent Lake, St. Johns Co., R. M. Harper 41; Dade Co., A. A. Eaton 14; Miami, Garber in 1877; Key West; Blodgett. TEXAS: Berlandier 680, 2090; Sabinal, C. Wright 1933; Rio Grande, C. Wright in 1848; East of Rio Grande, Rose & Russell 24359; Sutherland Springs,

<sup>1</sup> To quote from Blake (l.c.) "The name *Eleocharis capitata* (L.) R. Br. . . . has a somewhat peculiar status. It was based on 'Scirpus capitatus Linn. sp. pl. ed. Willd. l. p. 294,' but was expressly distinguished from the Gronovian plant, which of course Brown had examined, the type of *S. capitatus* L. Since, however, Willdenow's *S. capitatus* is based directly on Linnaeus's, the application of Brown's name must be determined by the Clayton plant on which rests the name-bringing synonymy of Linnaeus. The name *ELEOCHARIS CAPITATA* (L.) R.Br. must therefore now be restricted to the plant which has long been called *Eleocharis tenuis* (Willd.) Schultes."

<sup>2</sup> Benth. & Mueller (l.c.) reduce this to synonymy under *E. capitata* (i. e. *E. caribaea*).

<sup>3</sup> In Gray's Man. ed. 7 and Britton and Brown, Ill. Fl. ed. 2, the range is given from Maryland to Florida, etc. but there are no specimens from north of South Carolina in the Gray Herbarium nor at the New York Botanical Garden.

Wilson Co., *Palmer* 1328; Liberty Co., *C. Wright*; Western Texas to El Paso, *C. Wright* 711; Rio Coletto, *G. Thurber* in 1850. CALIFORNIA: San Bernardino, *S. B. & W. F. Parish* 1160, *S. B. Parish* 5277; Palm Canyon, Riverside Co., *I. M. Johnston* in 1917 and *F. W. Peirson* 5408. BERMUDA: Paget Marsh, *Britton & Brown* 215; Shelly Bay, *Harshberger* in 1905; *D. W. Fellows* 123; Pembroke Marshes, *A. H. Moore* 3164. BAHAMA ISLANDS: Andros, *A. E. Wight* 267; New Providence, *Britton & Brace* 501; Nassau, *Curtiss* 163. CUBA: *C. Wright* 712; Santa Clara, *Britton, Britton & Cowell* 10212; Isle of Pines, *Britton, Britton & Wilson* 14961, 14622; Santa Clara, *Ekman* 17128; Oriente, *Ekman* 6180; Havana, *Ekman* 897; Santa Clara, dist. Cienfuegos, *Combs* 626. PORTO RICO: *Sintenis* 1219, 5617; *A. A. Heller* 6412; San Juan, *Hioram* in 1913. VIRGIN ISLANDS: Purcells, *W. C. Fishlock* 312. JAMAICA: St. Thomas, *Harris* 12283; vic. of Windsor, *Maxon & Killip* 266. HAITI: Etang Saumatre, *E. C. Leonard* 3478, 3525; St. Michel de l'Atalaye, *E. C. Leonard* 7033; vic. of Petionville, *E. C. Leonard* 5087. GUADELOUPE: *Père Duss* 3910, 3126. TRINIDAD: *Britton, Hazen & Mendelson* 1654. GRENADA: Carricon, *Broadway* in 1898. CURAÇAO: *Currie & Haman* 186. ST. THOMAS: *Eggers* 81. ST. JAN: *Eggers* in 1877. MARGARITA: *J. R. Johnston* 204; *Miller & Johnston* 191 (G, P). MEXICO: Antiqua, Vera Cruz, *Purpus* 6249; Monterey, *Arsène* 6223; Victoria, Tamaulipas, *Palmer* 449; Guerrero, *Langlassé* 124; Hacienda de Angostura, *Pringle* 3812; Guaymas, *Palmer* 635 and 635½; Paradel Correo, *Liebmann*; Salina Cruz, *C. C. Deam* 105; Izamal, Yucatan, *Gaumer* 424. GUATEMALA: Dept. Baja Verapaz, *Tuerckheim* (S); Gualan, *S. F. Blake* 7675; Lake Izabal, *S. F. Blake* 7832; Laguna de Amatitlan, *Pittier* 117; Gualan, *C. C. Deam* 433. SALVADOR: Mahulingo, *Standley* 22032; San Vicente, *Standley* 21180. VENEZUELA: La Ceiba, *Pittier* 10882. COLOMBIA: Villavicencia, *F. W. Pennell* 1530; Dept. of Santander, *F. W. Pennell* 3845; Santa Marta, *H. H. Smith* 238; vic. of Cucuta, Dept. Santander, *Killip & Smith* 20975. BOLIVIA: Rio Perdix, Prov. Sara, Dept. Santa Cruz, *J. Steinbach* 7454. ECUADOR: Catamayo, *André* 4392. PERU: U. S. Exploring Expedition prope Tarapoto; *Spruce* 4190. FRENCH GUIANA: *Jelski* 1867 (Ph.). BRAZIL: Bahia, *Salzmann* in 1840; Rio de Janeiro, *Glaziou* 1293; Pernambuco, *Gardner* 1203 (G, S.). PARAGUAY: Ipacaray, *Hassler* 12658. AFRICA: Senegal, *Laprieur* in 1827; West. Trop. Africa, *G. Mann* 891 (in part); Socotra, *Balfour* 730. INDIA: Behar, *Hooker*; Bengal, *Wallich* 3486e, *Griffith*; Peninsula Ind. orientalis, *Wight* 1899; Ceylon, *Thwaites* 3039. CHINA: Hong Kong, *C. Wright* 593. PHILIPPINE ISLANDS: Manila, *E. D. Merrill* 55; vic. Manila, *Wilkes Expl. Exped.*; Manila, *R. C. McGregor* in *Kneucker, Cyp. et Junc. Exsicc.* 227. FIJI ISLANDS: Tahiti, *Leland, Chase & Tilden* 3; dripping rocks, base of maritime cliffs, Tahiti, *Setchell & Parks* 269. AUSTRALIA: Victoria River, *F. Mueller*.

There is some variation in this species. I have seen bristleless

specimens from Bahia (*Salzmann*) and Senegal (*Laprieur*). The style-base in some of the Indian and Chinese material is not depressed and some of the specimens from Tahiti tend to have lax scales. *E. caribaea* is apparently a common tropical species, and seems related to *E. atropurpurea*. Some of the material from eastern Brazil, especially in the region of Rio de Janeiro, is characterized by soft membranous scales. A recent collection from dripping sea cliffs at Avenida Niemeyer, Rio de Janeiro, *L. B. Smith* 1298, has lax roseate scales and at first sight the appearance of a distinct species.

Var. *DISPAR* (E. J. Hill) Blake. Scales purple-brown: achenes purple-black.—*RHODORA* xx. 24 (1918). *E. dispar* E. J. Hill, Bot. Gaz. vii. 3 (1882). *E. capitata* var. *dispar* Fernald, *RHODORA* viii. 129 (1906).—Known only from Lake County, INDIANA: Whiting, *E. J. Hill* in 1881, no. 192 in 1898; Wolf Lake, Whiting, *Agnes Chase* in 1897.

This variety is isolated in the sandy region near Lake Michigan, while the typical form is on the coastal plain. Peattie, *RHODORA* xxiv. 57–70, 80–88 (1922) has discussed in detail the presence of this and other coastal plain plants in the sand dunes of Lake Michigan.

43. *E. ATROPURPUREA* (Retz.) Kunth. FIG. 49. Dwarf annual, caespitose: culms 3–12 cm. high, capillary, erect or arcuate: sheaths deep-brown at base; the firm apex oblique and often attenuate: spikelet oblong-ovoid, 2–8 mm. long; the lower scales frequently deciduous: scales ovate, membranous, blunt, with broad green midrib and deep brown sides: style 2-fid: stamens 1–3: achenes strongly flattened, lenticular, obovoid, widest at the summit, 0.5 mm. long, smooth, lustrous-black: style-base minute, flattened, about  $\frac{1}{4}$  the width of the achene: bristles slender, translucent, shorter than the achene, often reduced or wanting.—Kunth, Enum. ii. 151 (1837); J. Gay, Flora, xxv. 641–646 (1842); Boeckl. Linnaea, xxxvi. 458 (1869–1870) excl. vars.; C. B. Clarke, Journ. Bot. xxv. 269 (1887); Terrac., Malpighia, ii. 311 (1888); Britton, Journ. N. Y. Micr. Soc. v. 101 (1889); C. B. Clarke in Hook. f. Fl. Br. Ind. vi. 627 (1893) and in Durand and Schinz. Consp. Fl. Afr. v. 596 (1895); Husnot, Ill. Cyp. 60, t. 17 (1905–1906); Hegi, Ill. Fl. Mitteleur. ii. 39 (1909 ?); Fiori, Nuov. Fl. Anal. Ital. i. 178 (1923). *Scirpus atropurpureus* Retz. Obs. v. 14 (1789); Reichb. Ic. Fl. Germ. viii. 37, t. 295, fig. 699 (1846). *Isolepis atropurpurea* R. & S. Syst. ii. 106 (1817). *Eleogiton atropurpurea* A. Dietr. Sp. Pl. ii. 97 (1833). *Aplostemon atropurpureum* Raf. ex Steud. Nom. Bot. ed. 2: 113 (1840).<sup>1</sup> *Eleogenus*

<sup>1</sup> The genus *Aplostemon* of Rafinesque, Jour. Phys. lxxxix. 105 (1819), contained the species of *Scirpus* with one stamen. Rafinesque included *Scirpus bracteatus* Bigelow (*Scirpus cespitosus* L. var. *callosus* Bigelow), *S. atropurpureus* Retz., *S. polytrichoides* Retz., and a few others, but did not make any actual combinations. With his characteristic logic he states that species of *Scirpus* with two stamens should form

*atropurpureus* Nees in Wight, Contr. Bot. Ind. 113 (1834). *Scirpus Lereschii* Thomas, Cat. Pl. Suiss. 44 (1837), *nomen nudum*; Reuter, Suppl. Pl. Vasc. Genève, 40 (1841). *Eleocharis Lereschii* Shuttlew. Flora, xx. 241 (1837); Palla in Koch, Syn. ed. 3. iii. 2545 (1905).<sup>1</sup> *Eleogenus laetivirens* Nees in Mart. Fl. Bras. ii.<sup>1</sup> 103 (1842). *Scirpus erraticus* Rota ex De Notaris, Ann. Sci. Nat. sér. 3. v. 366 (1846) and Linnaea, xix. 398 (1847). *Isolepis setifolia* A. Rich. Tent. Fl. Abyss. ii. 498 (1851). *Eleocharis Zanardini* Parl. Fl. Ital. ii. 67 (1852). *Eleocharis monandra* Hochst. ex Steudel. Syn. Cyp. 75 (1855). *Isolepis allochroa* and *I. dichroa* Steud. Syn. Cyp. 91 (1855), acc. to C. B. Clarke. *Eleocharis erratica* Steud. Syn. Cyp. 79 (1855). *E. laetevirens* Steud. Syn. Cyp. 79 (1855). *E. multiflora* Chapm. Fl. S. States, 517 (1860). *Elaeocharis atropurpurea* Schur, Enum. Pl. Transsilv. 691 (1885); *Trichophyllum atropurpureum* House, Am. Midl. Nat. vi. 204 (1920). ILLUSTRATIONS: Reichb. Ic. Fl. Germ. viii. t. 295, fig. 699; Fiori, Pl. Ital. Ill. fig. 431; Husnot, Cyp. France, t. 17; Robinson and Fernald in Gray, Man. ed. 7, fig. 243; Britton and Brown, Ill. Fl. ed. 2, i. fig. 763; C. B. Clarke, Ill. Cyp. t. 36, figs. 6-9.—Scattered in distribution in the tropics of both the Old and New World; in the United States from Florida and Georgia to Iowa, Nebraska, Colorado, Washington and Texas; also in Italy and Switzerland. The specimens which I have seen are: GEORGIA: sandy shore of Four Mile Pond, Decatur Co., R. M. Harper 1934. FLORIDA: Jackson Co. Chapman; Key West, Riddell (N. Y.). TEXAS: bed of Cibolo River, Selma, H. A. Groth 132. COLORADO: La Poudre River near Greeley, E. L. Greene. NEBRASKA: Exeter, Fillmore Co. J. H. Wibbe (N. Y.). IOWA: Muscatine, Reppert in 1895. MEXICO: Guadalajara, Pringle 4002 (in part), Pringle 3857 (N. Y.). COLOMBIA: circa de Piedras, André no. 1900. INDIA: Plan. Gang. Sup. Hooker & Thomson; Bengal, Griffith. AFRICA: Nubia, Kotschy 129 (*E. monandra*). SWITZERLAND: Lac Lemman, Leresche in 1861, Muret 13, Godet in 1853, Lerch in 1872.

This species can be readily identified by the minute glistening-black achenes with translucent setae.

The type locality is India. In Europe *E. atropurpurea* is isolated in northern Italy and about Lac Lemman, Switzerland; and in regard to its presence there Palla (Koch. Syn. ed. 3. iii. 2546) writes "This tropical species has without doubt first (and at a comparatively late

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the genus *Diplarinus*, and those with a bifid style another genus, *Dichismus*. (For a discussion of *S. bracteatus* Bigel. see Fernald, RHODORA, xxiii. 24 (1921)). The genus *Megadenus* of Rafinesque, Neogenyton, 4 (1825) differs from *Scirpus* in having two stamens and the achene crowned by a gland. "*Sc. palustris, capitatus, tuberculatus, etc.*" No new combinations were actually made.

<sup>1</sup> Palla takes up the name *E. Lereschii*, since, in his estimation *E. atropurpurea* (Retz.) Kunth is a collective species. There is, however, no mistaking *Scirpus atropurpureus* Retz. It is impossible to follow accurately the synonymy of this species as regards the South American material.

time, perhaps by transportation agencies) arrived in Italy and from there made its way into Lake Lemano." Merrill has not seen it from the Philippines. Bentham & Mueller cite *E. atropurpurea* from Australia and describe var. *setiformis* which has filiform culms less than 2 inches high; bristles very short or none. Fiori (Nuova Fl. Anal. Ital. l. c.) makes the following division:

A. Persistent base of the style orbicular-depressed.  $\alpha$ . TYPICA.

B. Persistent base of the style acute-elongated: spikelet and achene larger than the type. (Endemic in Italy).  $\beta$ . ZANARDINII.

Regarding the number of stamens in this species, Kunth (l. c.) says that the Wallich specimens have three stamens, but *Wallich* 3489<sup>a</sup> has all the flowers with one stamen. Both the African material (*Kotschy* 129) and Texas material have one stamen; occasionally two. The Switzerland material has two stamens, rarely one.

44. *E. PRATICOLA* Britton. FIG. 46. Culms slender, 4–12 cm. long, tufted, often spreading or recumbent: upper sheaths oblique and firm at the apex: spikelets 5–15-flowered, broadly ovoid, 2–3 mm. long: scales brown, ovate to lanceolate, obtuse, becoming lax in age: achene lenticular, obovoid, about 0.5 mm. long, black, shining; the style-base whitish, apiculate, less than  $\frac{1}{3}$  as wide as the achene: bristles coarse, white or light-brown, obscurely toothed, shorter than the achene, or often rudimentary.—Britton in *Small. Fl. Se. U. S.* 182 and 1327 (1903). *Scirpus ocreatus* Griseb. *Pl. Cub.* 239 (1866). *E. atropurpurea* C. B. Clarke in *Urban, Symb. Ant.* ii. 65 (1901), in part.—Florida, Cuba, and the Bahama Islands. FLORIDA: low places on prairies, Osceola Co., *A. Fredholm* 5820 (TYPE in herb. New York Bot. Gard.); low pinelands, Fort Meyers, *Jeanette Standley* 29; Dade Co., *A. A. Eaton* 837, in part. CUBA: *C. Wright* 3371 (in part). BAHAMA ISLANDS: Andros, *Small & Carter* 8684.

Since this species has black achenes about 0.5 mm. long it has passed as *E. atropurpurea*, from which it differs markedly in thicker, more spreading culms, few-flowered spikelets, coarse bristles and somewhat larger, slightly roughened achenes. It is more closely related to *E. caribaea* than to *E. atropurpurea*. According to the original description the achenes are dark-brown, but material from the type-collection in the Gray Herbarium has achenes which are black when mature, the immature achenes being dark-brown. The type-collection is evidently rather small material; and the species may be more wide-spread.

45. *E. BAHAMENSIS* Boeckl. Dwarf and sprawling, matted: culms of unequal length, 2–5 cm. long, capillary-setaceous, erect or recurved, obscurely quadrangular and lightly sulcate: apex of upper

sheath firm, oblique, elongated: spikelet minute, 1–2 mm. long, in fruit broadly ovate, 3–9-flowered: scales membranous, acutish, purplish-brown, with a green midrib: achene minute, about 0.5 mm. long, black and shining, the surface slightly roughened: style-base pallid, disciform, apiculate in the center, about  $\frac{2}{3}$  the width of the achene: bristles 6, slender, of unequal length, a little shorter than the achene, white, retrorsely toothed, united to form a prominent base.—Cyp. Nov. ii. 11 (1890). *E. atropurpurea* C. B. Clarke in Urban, Symb. Ant. ii. 66 (1900) in part (as to Bahama plant); Britton & Millspaugh, Bahama Fl. 49 (1920); not Kunth. *E. camptotricha* var. *Schweinitzii* C. B. Clarke in Urban, Symb. Ant. ii. 69 (1900).—Endemic in the BAHAMAS: Andros; Northeastern section, *Small & Carter* 8807; Conch Sound, *J. I. & A. R. Northrop* 745 (distributed as *E. camptotricha* var. *Schweinitzii*);<sup>1</sup> Fresh Creek settlement, *A. E. Wight*, 257 (distributed as *E. camptotricha* var. *Schweinitzii*).

46. *E. MICROFORMIS* Buckley. FIG. 45. Culms light-green, cespitose, setaceous, 4–10 cm. long, lightly sulcate, erect or arching: spikelets ovoid, obtuse or acute, 10–20-flowered; scales acute or obtuse, with a green or yellow midrib and light brown hyaline sides, sometimes rufescent: style bifid: stamens 2: achene 0.7 mm. long, broadly obovoid-pyriform, black, shining, the surface minutely pitted: style-base half as broad as the achene, pallid, flattened, apiculate in the middle: bristles 6, light-brown or whitish, coarse, of unequal length, retrorsely scabrous, shorter than the achene.—Proc. Acad. Sci. Phila. (1862) 10 (1863). *E. atropurpurea* Britton, Jour. N. Y. Micr. Soc. v. 101 (1889), in part.—TEXAS: northern Texas, *Buckley* (TYPE in herb. Philadelphia Acad.); *Reverchon* 14 in 1885; Blanco Co., *Reverchon* 3594; Howard's Creek,<sup>2</sup> Crockett Co., *C. Wright* 1930; *C. Wright* 1932, 1961; vic. Kerrville, Kerr Co., *A. A. Heller* 1851.

#### SPECIES DOUBTFUL OR NOT SEEN

*E. EKMANII* Kükenthal in Fedde, Rep. Spec. Nov. xxiii. 192 (1926). FIG. 44. —Cuba.

The achene of this species (as represented by *Ekman* 19005 in the

<sup>1</sup> Britton and Millspaugh (l.c.) discuss the incongruity of this name as applied to the Northrop specimens. Clarke's description reads: "stylobasi bulbiformi; spiculis basi interdum proliferis; nuce proventu luteo-brunnea. *Eleocharis prolifera* Torrey! in *Ann. Lyceum New York III* (1836) p. 316, nec p. 442. . . . Hab in ins Bahama: Northrop n. 524<sup>b</sup>; Guadeloupe: Bertero."

*E. camptotricha* is a member of an entirely different section with triangular achenes. Since *Northrop* 524b is the only tangible reference (and the description of the variety does not seem adequate), the only disposition of the name is as a questionable synonym of *E. bahamensis*.

<sup>2</sup> Although the label reads "C. Wright, Coll. N. Mex. 1851–1852," some of the collection was made in Texas by Wright in 1852, enroute from El Paso to San Antonio, in returning from the expedition,—see Gray, *Plantae Wrightianae* ii. 6 (1853). "Howards Creek" is written on the label by A. Gray and it is probable that no. 1932 and 1961 were collected in the same general region.

Stockholm Museum) is identical in size, coloration, and bristles with the achene of *E. caribaea*. The style-base is thickened, as is often the case in *E. caribaea*, by white pustule-like enlargements of the exterior cells. The plant, however, is very dwarf, 3–5 cm. high, and with inrolled lanceolate scales. It differs from *E. praticola* in the broad tubercle, and larger achene. Dwarf plants of *E. caribaea* with capillary culms occur, as in the collection by *W. E. Broadway* (Nov. 24, 1898) from Grenada, and *Maxon & Killip* 266 from Jamaica, and there is a tendency in some of these to have soft scales, which tend to become inrolled. Further study of them is needed.

*E. SHAFERI* Britton, Mem. Torr. Bot. Club, xvi. 59 (1920). Perennial; culms capillary, weak, densely tufted, about 2 dm. long: upper sheath apparently not scarious: spikelet oblong, 4–5 mm. long, 1–1.5 mm. thick, acute, few-flowered: scales pale, appressed, obtuse or obtusish, oblong or oblong-lanceolate; the lower one 2–2.5 mm. long, shorter than the upper ones: bristles 4–6, brownish, about as long as the achene and tubercle: style-branches 2: achene black, lenticular, oblong, 1 mm. long: tubercle sharply conic,  $\frac{1}{4}$  as long as the achene.—Bog-holes in wet thicket, Sierra Nipe near Woodford, Oriente, Cuba (*Shafer* 3414).

*E. MADAGASCARIENSIS* Chermeson, Bull. Soc. Bot. France, lxxv. 284 (1928).—Madagascar.—It differs from *E. caribaea* in its perennial character, lanceolate spikelet and less densely imbricated scales, larger achene (1 mm. long) and conical style-base.

#### Sub-series OCREATAE

47. *E. OLIVACEA* Torr. FIG. 43. Culms light-green, often decumbent, 2–15 cm. long (–3 dm. in elongate plants from the Southern States), flattened and grooved, diffusely tufted from slender rootstocks: apex of upper sheath membranaceous but not conspicuously dilated: spikelets oblong-ovoid, acute, 20–30-flowered, 3–7 mm. long: scales ovate, rather membranous and loosely imbricated, with green keel and brown sides, sometimes green throughout: style bifid: stamens 2 or 3: achene obovoid, narrowed at the base, 1 mm. long, olive to dark-brown; the surface punctulate and often marcescent: the conical style-base light-green, annular-thickened at the base, one-fourth as wide as the achene, sometimes prolonged into a subulate beak: bristles 6–8 (usually 7), green or whitish, opaque or semi-translucent, exceeding the achene, retrorsely toothed.—Ann. Lyc. N. Y. iii. 300 (1836) and Fl. N. Y. ii. 347 (1843); Boeckl., Linnaea, xxxvi. 461 (1869–1870); Britton & Brown, Ill. Fl. i. 250, fig. 581 (1896); Robinson & Fernald in Gray, Man. ed. 7: 182, fig. 242 (1908). *Scirpus olivaceus* Kuntze, Rev. Gen. i. 758 (1891). *Trichophyllum*



*olivaceum* House, Am. Midl. Nat. vi. 205 (1920).—Quagmires and wet sandy shores; Nova Scotia to Ontario, and southward to Florida, western Pennsylvania, Ohio, and Michigan, chiefly on the coastal plain. The following, selected from a large representation, are characteristic. NOVA SCOTIA: Argyle Head, Yarmouth County, *Fernald & Long* 23368; Wallace Lake, Italy Cross, Lunenburg County, *Fernald & Long* 23367; Tiddville, Digby County, *Fernald & Long* 20128. MAINE: tidal mud flats, Bowdoinham, *Fernald & Long* 12783; Somesville, *Fernald* in 1892; Brunswick, *C. A. Davis* in 1894. NEW HAMPSHIRE: Lower Baker Pond, Wentworth, *E. F. Williams* in 1908; Nottingham, *A. A. Eaton*. VERMONT: Lake Dunmore, *Brainerd* in 1899; Bristol Pond, *Pringle* in 1879; in mucky border of a pond, alt. 1500 ft., Ripton, *Brainerd* in 1899; Newfane, *A. J. Grout* in 1892. MASSACHUSETTS: Long Pond, Saugus, *C. E. Faxon* in 1879; Norwood, *Robinson & Fernald* in Pl. Exsicc. Gray. 134; Plymouth, *E. Tuckerman*; West Tisbury, *F. C. Seymour* 1096, 1601, 1864; Springfield, *C. H. Bissell* 901. RHODE ISLAND: Providence, *S. T. Olney*. CONNECTICUT: Pachaug Pond, Griswold, *C. B. Graves* 278; Lyme, *C. B. Graves* 279, 280; New Haven, *J. A. Allen* in 1878; North Guilford, *G. H. Bartlett* in 1906; Stratford, *E. H. Eames* in 1897. NEW YORK: Chase's Pond, Newcomb, *H. D. House* 11386; Slayton Pond, Conquest, *Eames, Randolph & Wiegand* 11411; Mud Pond, Oswego, *Fernald, Wiegand & Eames* 14182; Waterloo, *Metcalf & Wiegand* 5904; Summit Marsh, Spencer, *C. C. Thomas* 1759. NEW JERSEY: Tom's River, *C. F. Parker* in 1867; Winslow Junction, *Gershoy* 140; Point Pleasant, *Gershoy* 145; Manahawkin, *Long* in 1909; Wading River, Catsworth, *Van Pelt* in 1907. PENNSYLVANIA: Presque Isle, *Garber* in 1868; Long Pond, Luzerne County, *A. A. Heller* 698. MARYLAND: Clinton, *Holm* in 1922. DELAWARE: St. George, *A. Commons* in 1865. VIRGINIA: Fresh Pond, Princess Anne County, *L. F. & F. R. Randolph* 486. GEORGIA: *Baldwin* (Ph.). FLORIDA: sandy bed of a shallow stream, Milligan, *A. H. Curtiss* 6914. ONTARIO: Galt, *Macoun* in 1902; Bay of Quinte, *Macoun* 297. MICHIGAN: Park Lake, near Lansing, *C. F. Wheeler* in 1890. OHIO: Cleveland, *E. Claassen*.

Torrey (l. c. 1836) cites *E. olivacea* from "Pine barrens of New Jersey!; on Long Island near Babylon!; Tewksbury pond, Massachusetts." This member of a partly tropical group makes its way up the Atlantic Coastal Plain, spreading out into muddy shores of ponds in the glaciated area of the northeastern United States and southern Canada. Its occurrence inland is, however, localized. In quagmires bordering the sandy ponds of southeastern Massachusetts it is ubiquitous, and in the same region it reaches a phenomenal development in mud at the upper borders of salt marshes. In specimens from the New Jersey pine barrens and from Delaware, the

scales sometimes take on a coriaceous aspect, as in specimens collected by *Commons* at St. George, Delaware. Some of the southern material has the culms greatly elongated, notably *Gershoy* 145, *Randolph* 486 and *Curtiss* 6914. Clarke, Contr. U. S. Nat. Herb. x. 455 (1908) cites this species from Costa Rica (*Tonduz* 9697), but its presence there seems improbable.

48. *E. galapagensis*, n. sp., rigidula; culmis 12–26 cm. longis, erectis, viridibus, striatis; vaginis 3–5 cm. longis, membranaceis, obscuris, ad apicem marcescentibus, haud inflatis; spiculis 4–6 mm. longis, lanceolatis vel ovatis, ca. 15-floris; squamis linearibus, obtusis, 3 mm. longis, castaneis, dorso viridibus, erosis, ima majore viridi; achaenio obovato, nitente olivaceo, levi obscure striatulo; stylobasi parva, conica, viridi vel brunnea; setis cum achaenio aequilongis, albis.—GALAPAGOS ISLANDS: abundant in marshy ground, 1700 ft. altitude, Wreck Bay, Chatham Island, *A. Stewart* 1079 (TYPE in Gray Herb.).

This species differs from *E. flaccida* (which it resembles in its elongated aspect) in the castaneous spikelets and olivaceous achenes. The achenes resemble those of *E. Sellowiana* in color and striation, but the culms are not inflated.

49. *E. SCHAFFNERI* Boeckl. FIG. 39. Caespitose; culms light-green, capillary, setaceous, spreading, sulcate, 3–5 cm. high: apex of upper sheath membranous, scarcely inflated, obtuse: spikelet ovate, somewhat acute, 2–3 mm. long, 7–15-flowered: scales membranous, green, sometimes with light-reddish or bronze sides, broadly ovate, obtuse or acute: style bifid: stamens 2 or 3: achene 0.7 mm. long, olive-green; the surface with elongate black striations: style-base very small, flattened, gray, slightly apiculate, one-fourth as wide as the achene: bristles 6 or 7, white, somewhat shorter than the achene.—Boeckl. in Engler, Bot. Jahrb. vii. 274 (1886). *E. exilis* Boeckl. Cyp. Nov. i. 16 (1888).—MEXICO.

The type-collection is *Schaffner* 204 from San Luis Potosi. I have not seen this number, but *Schaffner* 575 (in part) from Morales, San Luis Potosi, in the Gray Herbarium, is unquestionably *E. Schaffneri*. On this sheet are three plants, the two smaller conforming exactly to the description. The larger specimen has identical achenes, but is a coarser plant, 12 cm. tall. However, I believe that it is the same, and that subsequent collections may furnish us with intermediate plants. This species is easily recognized by the very small olive-green achenes with depressed tubercles, and by the caespitose habit. *E. exilis* is likewise based on *Schaffner* 204, and the achene is described as light-green and longitudinally striolate.

50. *E. SELLOWIANA* Kunth. FIG. 42. Culms numerous, erect, somewhat spongy and thickened, 8–15 cm. long, 1.5–2 mm. wide when dry, striate, constricted below the spikelet: upper sheath with a divided hyaline fugacious apex: spikelet 5–10 mm. long, ellipsoid, acute, many-flowered: scales appressed, oblong, obtuse, scarcely keeled, stramineous, with a narrow brown stripe on each side of the midrib: style 2-fid: stamens 3: achene 0.8–1 mm. long, broadly obovate, turgid-lenticular, somewhat flattened at the margin, olivaceous, shining, minutely black-striate: style-base yellowish-green, short-conic, acute, marginulate below, about one-fourth as wide as the achene: bristles 7 or 8, glistening-white, shorter than the achene.—Enum. ii. 149 (1837); Boeckl. Linnaea, xxxvi. 465 (1869–1870); C. B. Clarke, Pl. Hassler, ii. 238 (1903); Hauman & Vanderveken, Phan. Argent. i. 210 (1917). *Eleogenus Sellowianus* Nees in Mart. Fl. Bras. ii.<sup>1</sup> 103 (1842). *Scirpus Sellowianus* Griseb. Symb. Fl. Argent. 312 (1879).—Brazil and Paraguay.

I have seen no authentic specimen, but *Ostén* 7882 (S) from Villa Eucaruaciou, Paraguay, from which the above description has been drawn, agrees very well with the description by Nees.<sup>1</sup> (Fl. Bras. l. c.; and specimens with more slender culms but identical achenes have been identified as *E. Sellowiana* by C. B. Clarke (S). According to Nees, *Eleogenus Sellowianus* differs from *E. orcreatus* in the thicker culms, somewhat constricted below the spikelet, and in the less plicated character of the sheath-apex. In the *Ostén* specimen the achenes are finely marked with short black striations.

Var. *HOMONYMA* (Steud.) Pfeiffer. Spikelets oblong-ovate: scales broadly hyaline at the margin: bristles 3.—Pfeiffer, Herbarium, no. 56: 54 (1921). *Eleocharis homonyma* Steud. Syn. Cyp. 79 (1855), which is based on *Lenormand* 36, Herb. Paris, from Guiana.

I have seen no material.

51. *E. CAPILLACEA* Kunth. FIG. 50. Rootstocks extensively creeping, forming dense mats: culms numerous, capillary, from thickened nodes of the rhizome, 1–4 cm. high, often arched or recurved: upper sheaths reddish-brown or greenish, membranous, slightly inflated at the apex: spikelets 2 mm. long, brown, linear to lanceolate, 1–3-flowered; usually only one achene ripening: scales 2–3, ovate-oblong, acute, reddish-brown, with a hyaline margin: style bifid: stamens 1 or 2: achene obovate, deep purplish-brown to shining-black when mature, 1 mm. long, narrowed at the base: style-base

<sup>1</sup> Some of the descriptions by Kunth, l. c. (1837) were apparently drawn from Nees' material or manuscript (cf. *E. albibracteata*).

depressed, greenish, one-half as wide as the achene, with a free thin margin below, extended upward into a narrow acute beak: bristles usually 7, brown, conspicuously toothed, somewhat exceeding the achene.—Enum. ii. 139 (1837); Boeckl. *Linnaea*, xxxvi. 434 (1869–1870); C. B. Clarke in *Pl. Hassler*. ii. 235 (1903); Palla in *Wettstein, Bot. Exped. Südbras.* i. 172 (1908); not *Scirpus capillaceus* Griseb. *Cat. Fl. Cubens.* 239 (1866) nor *Eleocharis capillacea* (as to West Indian plants) of C. B. Clarke in *Urb. Symb. Ant.* ii. 65 (1900), nor Kukenthal in *Fedde, Rep. Spec. Nov.* xxiii. 191 (1926). *Chaetocyperus capillaceus* Nees in *Mart., Fl. Bras.* ii.<sup>1</sup> 93 (1842).—Widely distributed in tropical South America. I have seen the following specimens. BRAZIL: *Sellow*; Agoa Clara, *Glaziou* 22328; opp. Curityba in campo humido, Parana, *Dusén* 117a (G, S); Ponta Grossa, Santa Cruz, *Dusén* 2707 (S); Santa Rita do Passo Quetro, S. Paulo, *Hemmendorf* 61 (S); in ripa arenosa rivi Cuyaba Mirim, Sao José, Matto Grosso, *Lindman* A2665 (S); Diamantino, Matto Grosso, *Lindman* A3515 (S); Prov. Magy-mirim, S. Paulo, *Mosén* 1751 (S); in ripa rivuli argillosa reptans, Sao Joao d'el Rei, Minas Geraes, *Lindman* A179 (S); Caldas, Minas Geraes, *Lindberg* 587 (S), 583 (S); Goyas, *Glaziou* 22328 (S). PARAGUAY: in viciniis Caaguazú, *Hassler* 9431.

The West Indian material is referred to *E. alveolata*, described on p. 241.

52. *E. FLACCIDA* (Reichb.) Urban. FIG. 47. Culms slender, light-green 0.5–4 dm. long, usually soft and lax, striate, in small specimens sometimes becoming somewhat rigid: apex of sheath membranous, white, inflated: spikelets 2–6 mm. long, ovate, acute or blunt: scales elliptic to oblong-lanceolate, membranous, pale-green or nearly white: style bifid: stamens 3: mature achene lustrous, purplish-brown, 0.8 mm. long, obovate, the surface minutely punctulate: style-base green, conic, acute; bristles 6 or 7 (rarely none), shining-white, shorter than the achene, retrorsely toothed.—*Symb. Ant.* ii. 165 (1900); Britton & Millspaugh, *Bahama Fl.* 48 (1920); Britton & Wilson, *Bot. Porto Rico & Virgin Isl.* 90 (1923). *Scirpus flaccidus* Reichb. ex Spreng. *f. Tent. Suppl. Syst.* 3 (1828). ? *S. flavescens* Poir. in *Lam. Encyc.* vi. 756 (1804). *E. capitata* Kunth, *Enum.* ii. 150 (1837), in part. *Eleogenus ocreatus* Nees in *Mart. Fl. Bras.* ii.<sup>1</sup> 102 (1842) in part, especially var. *flaccidus*. *Eleoch. ochreata* (Nees) Steud. *Syn. Cyp.* 79 (1855); Britton & Brown, *Ill. Fl.* i. 249, fig. 580 (1896); C. B. Clarke in *Urb. Symb. Ant.* ii. 63 (1900); Lindman, *Regn. Cyp.* 14, t. 2, fig. 1 (1900); Robinson & Fernald in *Gray, Man. ed.* 7: 181, fig. 241 (1908). *E. binocrenata* Nees ex Steud., *Syn. Cyp.* 79 (1855). *S. ocreatus* Griseb., *Fl. Br. W. Ind.* 570 (1864). *E. albivaginata* Boeckl. *Vidensk. Med. Kjob.* 1869: 133 (1870) and *Linnaea*, xxxvi. 436 (1869–1870) in part, especially var. *flaccida*; *S. anisochaetus* C. Wright in *Sauv. Fl. Cub.* 174 (1871). *E. thermalis*

Rydb. Mem. N. Y. Bot. Gard. i. 69 (1900). *E. flavescens* (Poir.) Urban, Symb. Ant. iv. 116 (1903). *Trichophyllum ochreatum* and *T. thermale* House, Am. Midl. Nat. vi. 205 (1920).—Southern New Jersey (acc. to W. Stone, Pl. So. N. J. 259 (1910) ), ? South Carolina and Georgia to Mississippi, and in hot springs at Yellowstone Park; southward into tropical America. I have seen the following specimens: SOUTH CAROLINA: *Ravenel* (perhaps not from South Carolina). GEORGIA: Alexander, Burke County, *J. B. Ellis* in 1860; Bulloch County, *R. M. Harper* 952. FLORIDA: shore of St. John River, Jacksonville, *Curtiss* 3076; miry places near Jacksonville, *Curtiss* 5065; moist sandy ground near Jacksonville, *Curtiss* 5694; Indian River, *Curtiss* 5806; Eustis, Lake County, *Nash* 2077; Apalachicola, *Chapman* 3880. MISSISSIPPI: Biloxi, *Ball & Tracy* in 1903. WYOMING: Sylvan Geysers, Yellowstone Park, *A. Nelson* 6157 (P, G); Lower Geyser Basin, Yellowstone Park, *Rydberg & Bessey* 3812. A specimen in the Pomona College herbarium collected by *Burton*, at St. Thomas, CALIFORNIA in 1882 may belong to this species. CUBA: *C. Wright* 711 (in part, mixed with *E. praticola*); *C. Wright* 3761 (*S. anisochaetus*); La Perla, Oriente, *J. A. Shafer* 8570. PORTO RICO: near Anasco, *A. A. Heller* 4532; *Sintenis* 176, 4180, *Eggers* 1330 (U. S.) JAMAICA: Peckham, Upper Clarendon, *Harris* 12809; near Albion, St. Thomas, *Harris* 12169. MARTINIQUE: *Hahn* 703. COSTA RICA: San Ramon, *Brenes* 14439. BRITISH GUIANA: *Jenman* 6117 (U. S.); *Hitchcock* 17026. FRENCH GUIANA: vic. Cayenne, *Broadway* 940 (U. S.). VENEZUELA: near Caracas, *Pittier* 9638, 9636; Colonia Tovar, Aragua, *Pittier* 9959. BRAZIL: Rio de Janeiro, *Wilkes Exped.*, 1838–1842. PARAGUAY: *Hassler* 5563 (very young). Reported by C. B. Clarke from many localities in the Old World. *Burchell* 1171 and 1600 from Brazil with very turgid achenes are perhaps to be included in this species.

In the southern United States, specimens of *E. flaccida* have often been confused with *E. olivacea*. Although several reports exist of its occurrence in Delaware, Virginia, and New Jersey, I have seen no undoubted specimens from north of Georgia.

The name *E. flaccida* seems to be strictly applicable only to the tall lax plant described by Sprengel as similar in appearance to *Scirpus simplex* Elliott, and coming from Dutch Guiana. This tall, lax plant I have seen from southern United States only in two collections, *Chapman* 3880 and *Harper* 952, but it apparently descends gradually into the dwarf, sometimes even rigid plant which has been included in *E. flaccida* by both Urban and Britton and which is treated by C. B. Clarke under typical *E. ochreata* Nees. *E. flavescens* seems to be involved, but I do not think its status can be determined until the actual Poiret specimens are examined. *Scirpus flavescens*

Poiret was described from a collection by *Ledru*, and characterized by greenish-yellow culms, "3 poll." [app. 7 cm.] high, enveloped at the base by a membranous sheath prolonged to an almost subulate point. The green spikelet, 1-3-flowered, was furnished at the base with two opposite, obtuse, concave scales a little shorter than the flowers. The achene is not described.

The name *Eleocharis ocreatus* has a peculiar status. The first adequate publication of the specific name is by Nees in Martius, Fl. Bras. (l. c.) as *Eleogenus ocreatus*, referring to *Eleocharis ochreata*, Linnaea, ix. 294 (1834) (a *nomen nudum*) as a "lapsu calami." The specific name refers to the peculiar character of the sheath-apices, comparable to the *ocreae* in the *Polygonaceae*. So complicated is the synonymy that it seems best to include here a brief tabular resumé (in English) of Nees' polymorphic *Eleogenus ocreatus* (l. c.) in order to obtain a clear interpretation of species which may be involved:

- α. Spikelets obtuse at both ends.
  - a. 1 *minor*. Membranaceous sheaths conspicuous, often duplicate. *Gardner* 150.
  - a. 2 *flaccidus*. Membranous sheaths not distinct; culms taller ("pedalibus"). *E. sulciculmis* Reichb. in Sieb. herb Trinit. n. 4. *Scirpus flaccidus* Reichb. in Weigelt herb. Surinam.
- β. Spikelets acute at apex and base ("acutiuscula").
  - b. 1 *pallida*. Spikelet pale green. Brasil. orient. *Chamisso & Sello*.
  - b. 2 *albo-ater*. Scales fuscous, margins white. *S. albo-ater* Schrader in Sched. Sao Paulo.
  - b. 3 *binocreatus*. Scales as in preceding; sheath-apex inflated, rugose. *Macrae*: Ins. St. Catharine. *E. maculosa* forma *humilis* Kunth, En. ii. 147. [No definite publication by Kunth and no citation of specimen]. *E. arcuata* Kunze in Poepp. Coll. Chil. n. 11.

For apparently no good reason, Boeckeler replaced *Eleogenus ocreatus* by the equally polymorphic *Eleocharis albivaginata* and under the latter treated five varieties: α. *tenuis* (Brazil, *Sello*); β. *flaccida* (*S. flaccidus* Reichb.); γ. *stricta* (*E. sulciculmis* Reichb. and *S. Gaudichaudianus* Kunth); δ. *macrostachya* (Brazil, Montevideo (*Sello*), Porto Rico); and ε. *humilis* (*S. flavescens* Poir. in hb. Willd. no. 1162, and *S. repens* Willd. no. 1175). Var. *humilis* was cited by Boeckeler from Carolina (*Beyrich*), Brazil (*Chamisso, Sello*) and Mauritius (*Du Petit-Thours*). *Scirpus flavescens* of the Willdenow herbarium is not necessarily identical with the Poiret specimen, but according to Urban, Symb. Ant. iv. 116 (1903) "ex hb. Desfont., verisimiliter a Ledru lect." *S. flavescens* was collected by Ledru in Porto Rico. C. B. Clarke in Durand & Schinz, Consp. Fl. Afr. v. 599 (1895) and in Urban, Symb. Ant. ii. 63 (1900) revived the name *Eleocharis ochreata*, still treating

it as covering a polymorphic species, but recognizing only two varieties besides the typical plant:  $\beta$ . *flaccida*, the elongated plant (3–5 dm. long) and  $\gamma$ . *humilis* (Boeckl.), the latter being the dwarf rigid plant, its range extended by Clarke to tropical Africa, Socotra, Madagascar, the Mascarenes and Australia. Finally Urban, Symb. Ant. ii. 165 (1900), made the combination *Eleocharis flaccida*, thus retaining the earliest specific name, but still equivalent, according to Urban, to "*Eleocharis ochreatea* Nees (1834) cum var. *flaccida* et *humilis*." It is to be hoped that an examination of the plants representing the synonyms included by Nees under *Eleogenus ochreatea*, in correlation with the more recent collections from South America, will clear up the difficulties of nomenclature of the American plants.

I have seen no material from the Old World, included under *E. ochreatea* var. *humilis* by C. B. Clarke. Chermezon, Bull. Soc. Bot. France, lxxv. 285 (1928) considers the Madagascar plant as *E. minuta* Boeckl. in Engler, Bot. Jahrb. v. 503 (1884). The type, *Hildebrandt* 3527, is a dwarf plant 1–2 cm. high, with sulcate quadrangular culms. Merrill, Enum. Phil. Plants, i. 120 (1922) states that he has seen no specimens of *E. ochreatea* from the Philippines, although C. B. Clarke, Phil. Journ. Sci. Bot. ii. 90 (1907) assigns *Loher* 742 to that species.

Var. *FUSCESCENS* Kükenthal in Fedde, Rep. Spec. Nov. xxiii. 191 (1926).—Culms strict, 5–10 cm. high: scales fuscous on the sides, the margins broadly whitish-hyaline.—Kükenthal cites two specimens from CUBA: *Ekman* 18763 from Pinar del Rio and *Ekman* 18369b from Prov. Santa Clara. I have not seen these specimens but *A. A. Eaton* 837 (in part) from Dade County, FLORIDA, in the Gray Herbarium, probably belongs to this variety, although the culms are only 3–5 cm. high.

53. *E. MACULOSA* (Vahl) R. & S. FIG. 40. Stolons elongate, castaneous: culms 7–35 cm. long, erect, striate, rigid: apex of upper sheath conspicuously enlarged, scarious, and rugose: spikelet 5–12 mm. long, ovoid to lanceolate, many-flowered, the scales densely imbricated: scales ovate, rather blunt, firm, shining, purplish-brown, with scarious margins; the lowest orbicular, with a prominent green midrib: style bifid: stamens 3: achene obovoid, narrowed at the base, 1 mm. long (not including the style-base), shining-black; the surface minutely roughened: style-base half as wide as the achene, light-brown, with a dilated base and a narrow subulate beak: bristles 7–8, reddish-brown, of unequal length, some usually equalling the achene; the retrorse teeth small but very numerous.—Syst. ii. 154 (1817); Kunth, Enum. ii. 146 (1837); Boeckl., Linnaea, xxxvi. 460 (1869–1870); C. B. Clarke in Urban, Symb. Ant. ii. 64 (1900) and in Engler,

Bot. Jahrb. xxx. Beibl. 68: 18 (1901). *Scirpus maculosus* Vahl. Enum. ii. 247 (1805). *Eleogenus ocreatus* vars.  $\beta$ 2. *albo-ater* and  $\beta$ 3. *binocreatus* Nees in Mart. Fl. Bras. ii.<sup>1</sup> 102 and 103 (1842) acc. to Boeckl. (l. c.). *Eleogenus Schottianus* Nees in Mart. l. c. 102 (1842). *Eleocharis Schottiana* Steud. Syn. Cyp. 79 (1855). *Trichophyllum maculosum* House, Am. Midl. Nat. vi. 205 (1920).—I have seen no specimens from the United States or Mexico that can be identified with this species, although C. B. Clarke has referred *Berlandier* 2090 from Texas to *E. maculosa*.<sup>1</sup> The type collection (*Richard*) is from Guadaloupe, and the species is apparently of frequent occurrence in tropical South America. Specimens examined. GUADALOUPE: *Duss* 3911. COLOMBIA: Agua Sucia, alt. 1800 m., *Langlassé* 88; Dept. Santander, *Killip & Smith* 21134, 19549 (very young); west of Popoyan, alt. 1500–1700 m., Dept. El Cauca, *Pennell & Killip* 7196, 8166, 8237 (in small part). VENEZUELA: near Merida, 1700 m. alt., *Pittier* 12860 (U. S.). BRAZIL: Sao Paulo, *Kneucker Exsic.* Cyp. 193; Rio de Janeiro, *Wilkes Exped.* 1838–1842; Organ Mts., *Gardner* 720 (G, U. S.); Parana, *Dusén* 3751 (U. S.), *Glaziou* 16526 (U. S.); Bahia, *Salzmann* (U. S.).<sup>2</sup>

According to C. B. Clarke in Engler, Bot. Jahrb. (l. c.), *E. VINCENTINA* Philippi, Anal. Univ. Chil. xciii. 349 (1896), a Chilean species, differs from *E. maculosa* in shorter culms, pallid bristles (not rufescent), and in smaller spikelets (4–5 mm. long). It is said to differ from *E. ochreatea* Nees (see *E. flaccida*) in castaneous spikelets and more rigid habit. *Philippi* 45 and 130 are cited by Clarke, and as synonyms *E. melanocarpa* Philippi, Linnaea, xxix. 85 (1857–1858); *E. hyalovaginata* Philippi, Anal. Univ. Chil. xciii. 352 (1896) and *Isolepis fuscopurpurea* Steud. Syn. Cyp. 99 (1855). *I. fuscopurpurea* is based on *Philippi* 265 from Valdivia, which is, however, described with a trifid style and without achenes. *E. VINCENTINA* var. *ARCUATA* C. B. Clarke (l. c.) has culms 5–14 cm. long, less rigid and often recurved. *Philippi* 46, 117 and 32 are cited, and in synonymy *E. arcuata* Kunze mss. ex Johow. from Juan Fernandez, *E. maculosa* Desv. in C. Gay, Fl. Chil. vi. 172 and *Scirpus Desvauxi* Philippi, Anal. Univ. Chil. xciii. 482 (1896).

54. *E. INTRICATA* Kükenthal. Rhizomes very slender, interwoven, and forming dense mats: culms 3–9 cm. high, compressed-quadrangular, striate, slender but firm, often recurved: sheath-apex hyaline, lax, attenuate: spikelet ovate to lance-ovate, 3–4 mm. long, about 5-flowered: scales not closely imbricated, rather acute, strongly keeled, with greenish-yellow midrib and brown sides;

<sup>1</sup> Britton, Journ. N. Y. Micr. Soc. v. 101 (1889).

<sup>2</sup> The Brazilian specimens differ consistently in having slender elongated culms and larger, thicker spikelets, with closely appressed scales.



the margins scarcely hyaline: achene obovate, 1 mm. long, shining-black, minutely punctulate, contracted at the base: style-base conic, acute, somewhat compressed, half as broad as the achene, of the same color as the bristles: bristles 6 or 7, exceeding the achene, white or light-brown, retrorsely scabrous; the bases united to form a prominent ring.—Kükenthal in Fedde, Rep. Spec. Nov. xiii. 135 (1914).—AFRICA: Nyassa-Highlands, Station Kyimbela, Rungwe, alt. 1600 m., *A. Stolz* 1132 (TYPE-COLLECTION, Ph.).

According to Kükenthal (l. c.) *E. intricata* is close to *E. olivacea* Torr. and *E. Sellowiana* Kunth, differing from the first in the shiny black achenes and from the latter in the smaller spikelets, color of the achenes, and the broader style-base.

Kükenthal (l. c.) also describes *E. MAIDENII*, a new species from New South Wales: Byron Bay (*W. Forsyth*); Centennial Park, Port Hacking (*A. Hamilton*). The achene is olive-green when mature, but is smaller than that of *E. olivacea*. The bristles are scarcely longer than the achene. The sharply-keeled scales clearly separate it from *E. olivacea* and *E. Sellowiana*. *E. intricata* is separated from *E. Maidenii* by the less membranous sheaths and the black achenes. From the same region *E. MAIDENII* var. *SUBAQUATICA* Kükenthal is described. This has flaccid culms up to 30 cm. in height and the spikelet is at times proliferous. I have seen no specimens.

55. *E. DEBILIS* Kunth. FIG. 41. Culms numerous, 15–20 cm. long, sub-capillary, lax: upper sheath membranous, truncate: spikelet ovate, 3–4 mm. long, 10–15-flowered, acute: scales ovate-elliptic, narrowed toward the apex, rather blunt, pale-brown, with a prominent green keel: style 2-fid: stamens 3: achene obovate, 1–1.3 mm. long, smooth, black (yellow when immature), with a short conical tubercle dilated at the base: bristles 6 or 7, brown, slender, retrorsely toothed, somewhat exceeding the achene.—Enum. ii. 143 (1837); Nees in Mart. Fl. Bras. ii.<sup>1</sup> 104 (1842); Boeckl. Linnaea, xxxvi. 434 (1869–1870); Lindman, Regnell. Cyp. 15, t. 2, fig. 4 (1900); Palla in Wettstein, Exped. Kaiserl. Akad. Südbrasil. i. 172 (1908).

The original collection was by *Sello* in Rio de Janeiro. The only specimen which I have examined is *Mosén* 3510 (S), collected at Santos, Sao Paulo (det. by C. B. Clarke and figured in Lindman, Regnell. Cyp. l. c.). This plant is readily distinguished from other members of the section by the capillary culms and broad greenish spikelets.

Forma *MACRA* (Kunth) Boeckl. Spikelets much smaller and paler, 3–5-flowered.—Boeckl. acc. to Kükenthal, Fedde, Rep. Spec.

Nov. xxiii. 192 (1926). *E. macra* Kunth, Enum. ii. 142 (1837). *E. debilis*, form (without name) Boeckl. Linnaea, xxxvi. 435 (1869–1870).—BRASIL: Brasilia Merid. prope Yriró, *Sellow*.

I have seen no specimens. Kükenthal cites this form from CUBA, citing *Ekman* 2146, Prov. Oriente, Sierra de Nipe, Rio Piedra.

#### SPECIES DOUBTFUL OR NOT SEEN<sup>1</sup>

See discussions under *E. intricata* and *E. flaccida*.

*E. YUNQUENSIS* Britton in Britton & Wilson, Bot. Porto Rico and Virg. Isl. 92 (1923) is closely related to *E. debilis*.

*E. PITTIERI* Boeckl. Allg. Bot. Zeit. ii. 35 (1896). Based on *Pittier* 548 (specimen seen in herb. U. S.) from Costa Rica. Close to *E. Schaffneri* Boeckl. but apparently a distinct species.

*E. LEHMANNIANA* Boeckl. Engler, Bot. Jahrb. viii. 205 (1887). Based on *Lehmann* 138 from Ecuador (Spec. seen in herb. U. S.). A distinct Andean species.

I have seen material of these species too late to include them in the present treatment.

#### GEOGRAPHICAL DISTRIBUTION OF SERIES MACULOSAE

The members of series MACULOSAE, sub-series RIGIDAE are most abundant in the New World, from Texas to Florida and the West Indies, *E. microformis*, *E. praticola*, and *E. bahamensis* being confined to the area, and *E. caribaea* and *E. atropurpurea* likewise occurring in the region. Especially in the West Indies there is difficulty in the precise delineation of species and their nomenclature. *E. caribaea* is distributed in coastal sands, and often in the interior, throughout the tropics and forms a large percentage of the collections of *Eleocharis* from tropical regions. *E. atropurpurea* reaches into the

<sup>1</sup> The following species, superficially resembling *E. capillacea*, belongs to a series (TENUISSIMAE) not specially treated in the present paper.

56. *E. alveolata*, n. sp., dense caespitosa; culmis 2–5 cm. longis, capillaribus, acutis angulatis, a punctis minutis brunneis inspersis, fere recurvatis; vaginis atrosanguineis, firmis, ad apicem paullo inflatis; spiculis linearibus, acutis, 2–3 mm. longis, fere sterilibus; squamis 3–4, elongatis, valde carinatis, brunneis, margine hyalinis; stylo 3-fido; staminibus 3; achaeniis in basi culmorum sitis, acutis trigonis, 1–1.3 mm. longis (cum stylobasi), apice basique angustatis, basi stipitatis, nitido-olivaceis, cancellatis; stylobasi trigona, conica, elongata, nigrescente, ad basin latiore; setis nullis.—Cuba; Brazil. CUBA: vicinity of Colombia, Isle of Pines, *Britton, Britton & Wilson* 15621; in pinelands, Herradura, Pinar del Rio, *Ekman* 17788 (TYPE in Gray Herb.; specimen also S); forming vast colonies in pinelands, Mendoza, *Ekman* 18761 (S); in white sand at shore of Laguna Sta. Barbara, *Ekman* 18111 (S); Sierra de Nipe Oriente, *Ekman* 5763 (S); *C. Wright* 3367, in part. BRAZIL: in vicinibus Santarem, Prov. Parã, "Scirpidium (4), September 1850," and "Scirpidium (5), July 1850," *Spruce*.

This species superficially resembles *E. capillacea*, Kunth (with which it has been confused by many writers), differing in the lack of an extensive rhizome, and in the presence of trigonous cancellate achenes. It belongs to an entirely different section, and stands between *E. retroflexa* and *E. Baldwinii*.

temperate regions of Europe and North America, but its occurrence is sporadic.

The sub-series OCREATAE likewise has its center of distribution in the New World. The species are almost entirely confined to the tropics, but one extra-tropical species, *E. olivacea*, extends along the Atlantic coastal plain and spreads out into the glaciated region of eastern North America. Another species, *E. flaccida*, is found in the hot springs at Yellowstone Park. The Brazilian species of this group are not clearly understood. Members are also found in Africa, Madagascar, and Australia.

#### EXPLANATION OF PLATE 191

(Achenes  $\times 15$ )

Fig. 39, *ELEOCHARIS SCHAFFNERI*, Mexico, *Schaffner* 575; 40, *E. MACULOSA*, Guadeloupe, *Duss* 3911; 41, *E. DEBILIS*, Brazil, *Mosén* 3510; 42, *E. SELLOWIANA*, Paraguay, *Ostén* 7882; 43, *E. OLIVACEA*, Rhode Island, *Olney*; 44, *E. EKMANII*, Cuba, *Ekman* 19,015; 45, *E. MICROFORMIS*, Texas, *Buckley*; 46, *E. PRATICOLA*, Florida, *Fredholm* 5820; 47, *E. FLACCIDA*, Martinique, *Hahn* 703; 48, *E. CARIBAEA*, Porto Rico, *Sintenis* 1219; 49, *E. ATROPURPUREA*, Georgia, *Harper* 1934; 50, *E. CAPILLACEA*, Brazil, *Sellow*; 51, *E. BAHAMENSIS*, Bahama, *Small & Carter* 8807.

POGONIA AFFINIS IN THE VICINITY OF WOLFEBORO, NEW HAMPSHIRE.—In 1918 a cluster of three plants in fruit of the rare orchid, *Pogonia affinis* Aust., was discovered in Alton, New Hampshire by F. H. Sargent.

On July 4, 1926 the discoverer extended his station by finding another group of about twenty plants scattered over some fifteen square rods of ground, situated about forty rods from the original station. The plants seemed to prefer the shallow hollows of leaf mould in a broad run in a mixed growth of gray birch and maple, with white pine close by.

In June of the present year, Miss Hazel Cotton, one of my pupils in botany, discovered a second station in Brookfield, New Hampshire, perhaps ten miles from the Alton station. This station is also double, containing five plants at one place and about ten plants at another place thirty-five or forty rods away. Nearly all these plants produced flowers, about half of them having two flowers. They were a week earlier than the Alton plants this year, where but eight plants could be found, only one of which was in flower.

The Brookfield station is similar to the Alton one so far as the woodland growth is concerned, but the shallow hollows were not so marked.